

B3 Infection and response

Biology Paper 1 | AQA Combined Science Trilogy | Core knowledge for both tiers

Pathogen: a disease-causing microorganism. Bacteria may release **toxins**; viruses reproduce **inside living cells**.

Disease / cause	Main signs or effects	How it spreads	Control to remember
Measles Virus	Fever and red rash; complications can be serious.	Inhaled droplets from coughs or sneezes.	Vaccination; reduce contact while infectious.
HIV Virus	Early flu-like illness; immune damage can lead to AIDS.	Sexual contact / infected body fluids, e.g. shared needles.	Condoms; do not share needles. Antiretroviral drugs control HIV.
TMV Virus	Mottled leaves; less photosynthesis and growth.	Contact with infected material, hands or tools.	Clean tools; remove infected plants.
Salmonella Bacterium	Fever, cramps, vomiting and diarrhoea.	Bacteria swallowed in contaminated food.	Food hygiene; thorough cooking; vaccinate poultry.
Gonorrhoea Bacterium	Pain when urinating; yellow/green discharge.	Sexual contact.	Condoms; suitable antibiotics. Resistant strains are harder to treat.
Rose black spot Fungus	Dark spots; yellow leaves fall. Less photosynthesis.	Spores carried by wind or water.	Fungicides; remove and destroy affected leaves.
Malaria Protist	Repeated bouts of fever; can be fatal.	Infected mosquito bites. The mosquito is the vector.	Mosquito nets; reduce mosquito breeding.

1 Defend the body

Skin / clots: block entry.
Nose hairs + mucus: trap particles.
Cilia: move mucus to the throat.
Stomach acid: kills many pathogens.

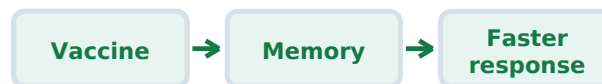


→ **White blood cells**

Phagocytosis: engulf and digest.
Antibodies: bind specific antigens.
Antitoxins: neutralise toxins.

2 Vaccination and medicines

Vaccine antigens trigger antibodies and immune memory. Next time: correct antibodies are made faster. Many immune people reduce transmission.



Antibiotics: bacteria, not viruses.
Painkillers: symptoms, not pathogens.
Resistance: susceptible bacteria die; resistant survivors reproduce.

3 Discover and test drugs

Willow → aspirin
Foxglove → digitalis
Penicillium → penicillin (Fleming)
Preclinical: cells, tissues, animals.
Clinical: volunteers and patients; start with very low doses.
Check **toxicity, efficacy and dose**.
Placebo: no active drug.
Double-blind: participants and assessors do not know allocation.
Peer review: other scientists check.